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TO: MEMORANDUM FOR FILES DATE: 6 December 1950

FROM: [redacted] 25X1

SUBJECT: Informal report of trip to [redacted] in connection with Contract RD-13 and other subjects 25X1

1. The writer visited the [redacted] 25X1 Los Angeles 7, California, from 20 November 1950 through 24 November 1950. A visit was particularly desirable at this time because of scheduled type tests on the URC/"point 5." However, unforeseen complications have forced [redacted] 25X1 project engineer, to delay the type tests for some time. A recent batch of tubes from Raytheon showed an unexpected change in plate impedance, caused by a redesign of internal tube structure. This change in plate impedance upset [redacted] carefully calculated audio section, necessitating a redesign of on 25X1 transformer and the speaker-microphone.

At present a minimum output of 100 milliwatts of r.f. from the transmitter, a minimum receiver sensitivity of 10 microvolts @ 4:1 power ratio, and a receiver audio output of 30 milliwatts can be guaranteed. This writer witnessed a bench test of the unit which far exceeded the above minimums.

The output frequency of the unit is 120 Mc., using a 60 Mc. crystal. Its tuning range is approximately 10 Mc. with the powdered iron slugs to allow for manufacturing tolerances in the tuned circuits. A band width of approximately 3 Mc. is required for each channel. The audio response of the unit is adequate on all the usable speech frequencies from 500 to 3000 cycles.

Receiver sensitivity of the URC/"point 5" is measured according to the following extract from MCREE 322A, Air Force Specification for URC-2, URC-6:

> "E-10b (2) Using the specified dummy antenna, (terminating resistor of 50 ohms in probe of Model 80 Measurements Corporation Signal Generator) ((padded to 6-10 ohms by Hoffman)), the sensitivity of the receiver over its entire frequency range shall be as follows: With 30 per cent modulation at 1000 cycles (standard signal), and with a 10 microvolt input, the signal plus noise-to-noise ratio shall be at least 4 to 1 in power. With any signal input of 15 to 10,000 microvolts modulated 30 per cent at 1000 cycles, the audio output shall not exceed 75 milliwatts nor be less than 15 milliwatts."

The problem of radiation of the super-regenerative detector in the receive position has been investigated. Any reduction in detector radiation is necessarily bought at the expense of detector sensitivity. However, a 40 db reduction in detector radiation at the expense of 2 microvolts of sensitivity has been obtained by using a very broad r.f. stage. A really good r.f. stage would mean a much greater sacrifice in sensitivity.

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[redacted], having received very little cooperation from battery manufact 25X1
on the problem of small, high capacity units, has left the entire battery problem "up in the air," so to speak. Battery size would be determined entirely by life expectancy based on presently available batteries. Herewith is given battery drain for the present unit:

Battery Data URC/"point 5"	"A" Battery	"B" Battery
Nominal Voltage	1.5	100 maximum
"Receive," Milliamperes	235.0	1.3
"Transmit," Milliamperes	345.0	21.0
End Voltage	1.125	78.0

One possibility for batteries is the BA-1265/U, a battery very similar to BA-1264/U (URC-4 battery) except for physical size and voltages. BA-1265/U is designed for use with the AN/URC-2 and AN/URC-6 with voltages of 1.5 "A" and 90 "B". This battery is 6 inches by 3 1/4 inches by 1 1/8 inches (approximately) which is practically the same height and width of BA-1264/U and about half its thickness. However, its availability is not known to this writer.

Provisions for an external microphone, and hearing aid type phones will be fairly simple. A 5-prong miniature socket with dummy plug containing necessary jumpers will allow any type of external hook-up desired.

[redacted] has in his possession a sample audio system for the URC/"point 25X1
experimentally built by Centralab with their printed circuit technique. The Centralab system is assembled on a 1/8 inch thick ceramic plate approximately the size of a postage stamp. While not yet installed in the URC/"point 5", this audio system would replace two large terminal boards and allow a more compact overall assembly.

[redacted] has, for all practical purposes, completed its 25X1
self-financed portion of the development of the URC/"point 5". At this writer's request, a set of photographs (eight) were made, copies of which are herewith enclosed.

At his own suggestion, [redacted], Manager of Special Apparatus 25X1
Division, is preparing a cost estimate of the unit. Said extimate should be received by this Agency in the near future.

In the event this Agency is not interested in the URC/"point 5," it will then be offered to the Royal Canadian Air Force and to the United States Air Force, in the order named.

2. "Hotshot," Contract RD-13, is progressing rather well. It should be noted at this time that [redacted] 25X1 Santa Monica, California, is planning to expand its plant facilities as a direct result of new financial interests in the firm. Since the new investor(s) would undoubtedly become cognizant of this Agency's dealings with the [redacted] 25X1 [redacted], the security branch of this Agency should be notified. 25X1

This writer inspected all the fabricated parts for "Hotshot" mentioned in the Engineering Progress Reports for periods ending 30 September 1950 and 31 October 1950. In addition, the following parts were completed while the writer was in Los Angeles:

a. Cast and hardened piston blanks
b. Inner Magnet Tie - Generator Rotor
c. Retaining Disc - Rotor
d. Pole Piece (Laminations)

All parts inspected showed evidence of high quality workmanship.

A trip to the shop of [redacted], of Glendale, master pattern-maker wa 25X1 very enlightening. [redacted] is sub-contractor to [redacted] 25X1 Company for the major aluminum alloy casting paterns used in "Hotshot." Patterns for generator housing, blower scroll, and generator end-plate are approximately 75 per cent complete. Patterns for cylinder halves and crankcase are almost 25 per cent complete. These patterns were notable for their excellent workmanship.

Back at [redacted], the writer witnessed a bench test of [redacted] 25X1 latest ignition system as described in his report dated 7 November 1950. The setup looked good on the bench, but rather than wait for the completed "Hotshot", the system will be tested on a "Cyclone" model aircraft engine of approximately 0.60 cubic inch displacement.

3. During a lengthy discussion of the URC-4, participated in by [redacted] 25X1 [redacted] project engineer of the unit, and 25X1 the writer, the following points were brought out:

a. The name and instruction plate are lithographed on sheet brass. Costs from $50.00 to $75.00 to change setup. Thereafter, modified nameplates cost approximately 50 cents each.

b. A 5-pin socket used with a dummy plug containing necessary jumpers will provide connections for external mike, phones, and key.

c. [redacted] will initiate tests using the T-30 throat mike and the HS-30 headset externally to the URC-4. 25X1

d. The outside case can be finished any color desired. This includes elimination of all external bright plating.

e. Antenna handles can be molded of different color plastic at no increase in price for lots of 500 or more.

f. Copies of [redacted] type test reports and photographs will be made available to this Agency in the near future. 25X1

g. Following is a list giving correct nomenclature and prices each on URC-4 equipment. Some of these prices may vary with quantities purchased.

Radio Receiver-Transmitter, RT-159/URC-4	$255.82
Cable, used with Radio Set RT-159/URC-4, CX-1093/U (2 feet - 6 inches)	7.03
Cable, used with Radio Set RT-159/URC-4, CX-1093/U (5 feet - 6 inches)	7.55
Battery, JAN, BA-1264/U, used with Radio Set RT-159/URC-4	
Vest, Radio Carrier, used with above set	18.69

Size	Stock No.
Extra Large	8300-978 - 500
Large	8300-978 - 510
Medium	8300-978 - 520
Small	8300-978 - 530

Analyzer, AN/URM-30, for above set	104.27
Dropable Kit, for above set, consisting of:	107.85
Streamer Assembly	
Container	
Parachute	
Operation and Service Instructions Radio Set RT-159/URC-4 T.O. No. 16-30URC4-2	
Maintenance Instructions Radio Set RT-159/URC-4 T.O. No. 16-30URC4-3	
Parts Catalog for above set, T.O. No. 16-30URC4-4	

h. [redacted] is preparing a preliminary cost estimate, together with proposed security measures on the above mentioned modifications. This is expected to be received by this Agency in the near future. 25X1

i. It will be necessary to secure copies of the Air Force type tests on the URC-4 from Wright Field. A letter has been sent requesting same.

j. Out of the four complaints of this Agency against the URC-4's already received, [redacted] has already picked up three and has promised to investigate the fourth item along with the others. 25X1

4. Two items of interestto this Agency are as follows:

a. [redacted] is at present negotiating to buy the patent rights on a cold cathode interrupter device for replacing vibrators in conventional power supplies such as auto radios, etc. This device consists of a capillary column of mercury with contact electrodes at each end. Theoretically, the mercury vaporizes - breaks the circuit, condenses - closes the circuit, at a frequency determined by the bore of the capillary, the ambient temperature, and other factors. Some of the features are high current capacity, high frequency, very small size, no mechanical moving parts. [redacted] 25X1
[redacted], Director of Research and Development, expects to be in 25X1
Washington sometime within the next two months and will be glad to present details of the invention at that time.

b. An experimental emergency transmitter designed to replace the famed "Gibson Girl" unit. This unit contained a hand-cranked generator and two tube transmitter within a case approximately the size of the early model URC-4 (6 1/2 by 3 1/2 by 1 1/2 approximately). The generator used a rotating field, two stator windings (one for "A" and one for "B"), two selenium rectifiers, filters, and a combination neon tube voltage regulator and indicator. At nominal cranking speed, 75-100 milliwatts were obtained from the generator, and 35 milliwatts from the transmitter. A built-in key was located conveniently for the hand holding the unit, while the other hand cranked. This unit was built for the U. S. Navy Bureau of Aeronautics under Contract NOBsa 29044.

[redacted] 25X1

Enclosures - 8 photos of URC/"point 5"

cc: [redacted] 25X1